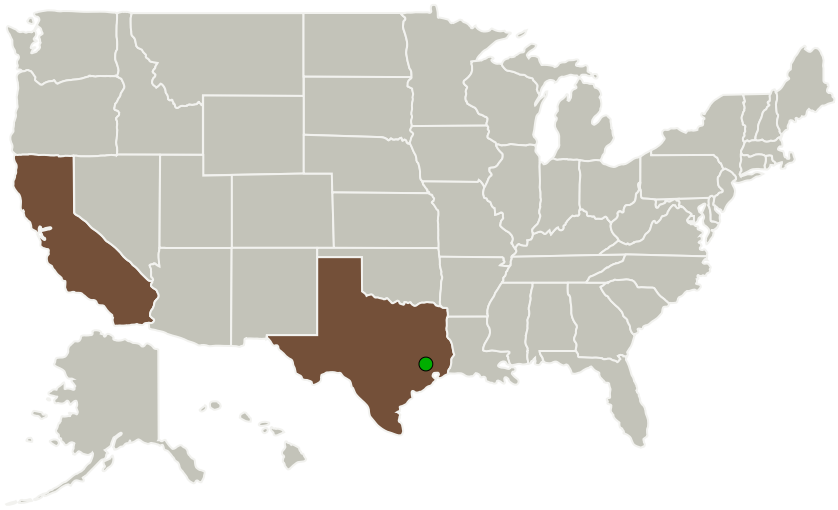
Robotic, MEMS-based Multi Utility Sample Preparation Instrument for ISS Biological Workstation, Phase I

Completed Technology Project (2012 - 2012)

Project Introduction

This project will develop a multi-functional, automated sample preparation instrument for biological wet-lab workstations on the ISS. The instrument is based on a transducer technology developed by Microsonics Systems; BLU (Bulk Lateral Ultrasonic). BLU works by using a MEMS based transducer, which when excited with RF power generates ultrasonic waves. Since these waves when focused by an Fresnel Annular Sector Actuator (FASA) have a very high level of lateral ultrasonic thrust, the coupling of them into a well causes a lateral mixing vortex. Banks of these transducers are contained in a multi-station, robotic, compact instrument. The instrument utilizes a centrifuge to produce a gravity vector into tubes containing samples which are ultrasonically coupled to the FASA transducer. The electrical energy is inductively coupled into the transducer which generate BLU energy for fluid processing in the sample tube. Samples placed into the instrument will be directed to the proper transducer set (correct BLU power), for 1) cell/tissue lysis, 2) cell fractionation, 3) Sample mixing and compound solubilization 4) DNA shearing for microbiological applications, e.g., PCR, micro array analysis, other analysis (TBD).

Primary U.S. Work Locations and Key Partners



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Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
Microsonic Systems Inc.	Lead Organization	Industry	San Jose, California
Johnson Space Center(JSC)	Supporting Organization	NASA Center	Houston, Texas

Primary U.S. Work Locations	
California	Texas

Project Transitions

February 2012: Project Start

August 2012: Closed out

Closeout Documentation:

- Final Summary Chart*(https://techport.nasa.gov/file/138466)*

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Microsonic Systems Inc.

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

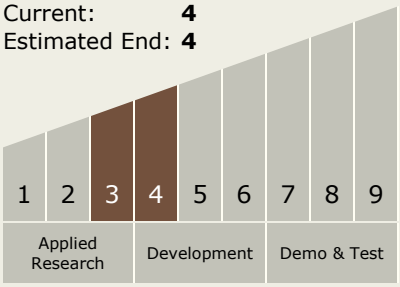
Carlos Torrez

Principal Investigator:

Vibhu Vivek

Technology Maturity (TRL)

Start: **3**
Current: **4**
Estimated End: **4**



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Technology Areas

Primary:

- TX08 Sensors and Instruments
  - TX08.3 In-Situ Instruments and Sensors
    - TX08.3.2 Atomic and Molecular Species Assessment

Target Destinations

The Moon, Mars, Outside the Solar System, The Sun, Earth, Others Inside the Solar System